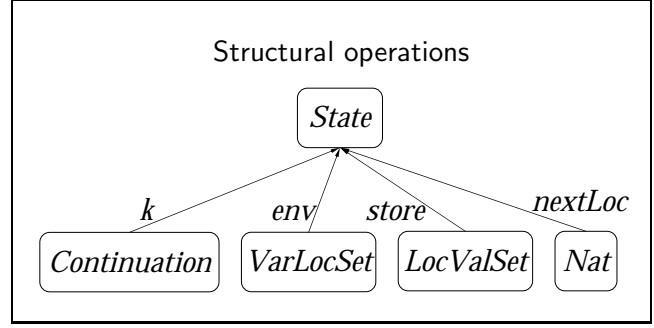


import *BOOL*, *INT*, *K-BASIC*



$$\begin{aligned}
 & \left. \begin{array}{l} eval : Exp \rightarrow Val \\ result : State \rightarrow Val \end{array} \right\} \dots \dots \dots \left\{ \begin{array}{l} \frac{eval(E)}{result(k(E) \ env(\cdot) \ store(\cdot) \ nextLoc(0))} \quad (1) \\ \frac{result\langle k(V) \rangle}{V} \quad (2) \end{array} \right. \\
 & \left. \begin{array}{l} Var, Bool, Int < Exp \\ Bool, Int < Val \end{array} \right\} \dots \dots \dots \left\{ \begin{array}{l} k(\frac{X}{V}) \ env\langle (X, L) \rangle \ store\langle (L, V) \rangle \quad (3) \end{array} \right. \\
 & not_ : Exp \rightarrow Exp \ [!], \ not_{Bool} : Bool \rightarrow Bool \\
 & _ + _ : Exp \times Exp \rightarrow Exp \ [!], \ _ +_{Int} _ : Int \times Int \rightarrow Int \\
 & _ < _ : Exp \times Exp \rightarrow Exp \ [!], \ _ <_{Int} _ : Int \times Int \rightarrow Bool \\
 & \left. \begin{array}{l} \lambda_ _ : VarList \times Exp \rightarrow Exp \\ _ _ : Exp \times ExpList \rightarrow Exp \ [app] \\ closure : VarList \times Exp \times VarLocSet \rightarrow Val \end{array} \right\} \dots \dots \dots \left\{ \begin{array}{l} k(\frac{\lambda Xl.E}{closure(Xl, E, Env)}) \ env(Env) \quad (4) \\ k(\frac{closure(Xl, E, Env), Vl \curvearrowright app}{Vl \curvearrowright bind(Xl) \curvearrowright E \curvearrowright Env'}) \ env(\frac{Env'}{Env}) \quad (5) \end{array} \right. \\
 & if_then_else_ : Exp \times Exp \times Exp \rightarrow Exp \ [!(1)[if]] \dots \dots \dots \left\{ \begin{array}{l} \frac{bool(true) \curvearrowright if(E_1, E_2)}{E_1} \quad (6) \\ \frac{bool(false) \curvearrowright if(E_1, E_2)}{E_2} \quad (7) \end{array} \right. \\
 & \left. \begin{array}{l} Loc < Val \\ ref_ : Exp \rightarrow Exp \ [!] \\ \star _ : Exp \rightarrow Exp \ [!] \\ _ := _ : Exp \times Exp \rightarrow Exp \ [!] \end{array} \right\} \dots \dots \dots \left\{ \begin{array}{l} k(\frac{V \curvearrowright ref}{loc(L)}) \ nextLoc(\frac{L}{next(L)}) \ store\langle \frac{\cdot}{(L, V)} \rangle \quad (8) \\ k(\frac{loc(L) \curvearrowright \star}{V}) \ store\langle (L, V) \rangle \quad (9) \\ k(\frac{(loc(L), V) \curvearrowright :=}{V}) \ store\langle (L, \frac{_}{V}) \rangle \quad (10) \end{array} \right. \\
 & halt_ : Exp \rightarrow Exp \ [!] \dots \dots \dots \left\{ \begin{array}{l} k(V \curvearrowright \frac{halt \curvearrowright _}{\cdot}) \quad (11) \end{array} \right.
 \end{aligned}$$

Figure 1: Definition of Syntax and Semantics of λ_K in K